

the season was more favorable. In seasons like 1892 with an abundance of rain the sulphosteatite and ammoniacal carbonate of copper wash off much easier than the Bordeaux mixture.

L. H. PAMMEL: *Relation of frost to certain plants.*—This paper gave a record of the exact temperature at which certain plants were killed. In several cases like castor-oil bean the lower leaves were affected while the upper long remained green. So also *Zea Mays*, *Scabiosa atropurpurea*, *Marrubium vulgare*, *Nepeta cataria*, *Phlox Drummondii* and *Cosmos* are quite resistant to frost.

S. A. BEACH: *Bean anthracnose and its treatment.*—It has been known for some time that when anthracnosed seed is planted the disease most frequently is found on the cotyledons as soon as they push through the surface of the soil, but it may be found on any other part of the plant above the roots. Experiments made in treating the seed and plants as compared with clean seed show that the selection of clean seed is the most important and effective method of securing healthy plants.

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### BRIEFER ARTICLES.

The use of blue-print paper in recording root curvatures.—The common blue print paper so much used by photographers, architects, and mechanical engineers, is not, so far as we are aware, of frequent use in botanical laboratories; yet it may be employed for a number of purposes with a considerable saving of time. We have found it particularly valuable in printing the angles of both primary and secondary roots that have been subjected to galvanic currents, and also in printing the geotropic bendings of secondary roots, to make an accurate drawing of which would require considerable time; whereas an exact reproduction can be obtained in a very few minutes. This is most easily accomplished if we have either an air or water culture, by fastening a piece of the sensitive paper to the outside of the glass jar in which the plants are growing, and exposing them for a few moments to sunlight. It is better still, especially if the plants are cultivated in cylindrical jars, to transfer them to a rectangular glass jar filled with water, and of sufficient size as to allow the secondary roots to main-

tain their natural position. Such a jar as is commonly used for the cultivation of seedlings answers well for this purpose. The sensitive paper can be fastened to the back of the jar by means of soft wax. The object should be exposed to strong sunlight, and a window should be chosen in which the direct rays can be reflected horizontally from a mirror upon the object, which in turn projects its shadow upon the sensitive paper. The object should be placed as near the paper as possible so that a well-marked shadow is obtained, and consequently a clearly defined print. From two to five minutes exposure in strong sunlight is sufficient to obtain a print, after which the paper should be treated to a water bath and dried in the usual way.—GEORGE E. STONE, *Leipzig*.

A new order of Schizomycetes.—The following should be substituted for lines twenty-two to thirty in the preceding number of this journal, p. 403.

*Myxobacter aureus* n. sp.—Plate XXV, figs. 34-36.—Colonies when rising to form cysts milky white. Rods large, cylindrical, rounded at either end,  $4-7 \times .7-.9\mu$ . Cysts spherical or oblong, golden yellow, thick walled, one to twelve or more in number, distinct within a hyaline matrix,  $75-350 \times 75-275\mu$ . The encysted rods mingled with a yellow oily material. Cyst groups  $.7-1^{\text{mm}}$  long.

On very wet wood and bark, in swamps. Kittery Point, Me., Belmont, Mass.

*Myxobacter simplex* n. sp.—Rods as in *M. aureus*. Cysts solitary within a thin envelope, very large, irregularly rounded, bright reddish yellow,  $250-400\mu$  in diameter. The encysted rods flesh-colored in the mass and adhering in numerous elongate groups.

Occurring, sometimes with the last, in the same localities and habitat.

The two species above described are very common in the situations mentioned, being found most frequently on sticks lying in partly dry wood pools. In general appearance they greatly resemble a minute *Trichia*, and are conspicuous from their very bright color. The cysts or groups of cysts are never crowded, and are usually sparsely scattered over the substratum. Neither of these forms has been cultivated apart from its natural substratum. In *M. aureus* all stages of development have been obtained from the first appearance of the rising rod mass. The cysts are formed from this mass by a rolling together of the rods at certain points corresponding in number to the cysts to be produced. As the cysts roll themselves together, they become gradually separated from the hyaline matrix in which they are finally imbedded. The